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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WILKINS III, HARRY D

ART UNIT PAPER NUMBER

1742

DATE MAILED: 12/19/2002

#22

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/465,492

Applicant(s)

SEGAL ET AL.

Examiner

Harry D Wilkins, III

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 October 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-3 and 45-72 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 45-72 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 December 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10, 12, 15, 18, 19 6) ☐ Other:

### DETAILED ACTION

1. Claims 1-3 and 45-72 are pending.
2. The objection to claim 2 has been withdrawn in view of the amendment filed 6 June 2001.
3. The rejection under 35 U.S.C. 102 based on the Dulop et al reference has been withdrawn.
4. The new grounds of rejection are as follows.
5. Applicant's request for reconsideration of the finality of the rejection of the Office action originally mailed 06 March 2002 is persuasive and, therefore, the finality of that action is withdrawn.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-3, 45-49, 51, 52 and 54-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunlop et al (US 5,590,389) in view of Kiiski et al (US 5,623,726).

Dunlop et al teaches a sputtering target and the method of making the sputtering target. Dunlop et al teach (see col 4, lines 16-21) a sputtering target that is substantially aluminum with copper added at less than 10 wt%. This sputtering target is produced

from atomized metal powder and is then subjected to multiple passes of equal channel angular extrusion.

Dunlop et al do not specify that the sputtering target has a substantially homogeneous composition at any location as claimed in (a) of claim 1.

Regarding characteristic (a), the sputtering target of Dunlop et al is made from an identical composition by a process that involves atomization followed by equal channel angular extrusion. Kiiski et al teach (see col 2, lines 64-67) that atomization of metals produces fully homogenous materials. Therefore, it would have been expected by one of ordinary skill in the art that the sputtering target of Dunlop et al is substantially homogenous composition as claimed.

Regarding characteristic (b), the sputtering target of Dunlop et al is made by a process that does not include casting and therefore, would have been expected by one of ordinary skill in the art to have a substantial absence of casting defects as claimed.

Regarding characteristic (c), Dunlop et al teach (see abstract) that the sputtering target has a small [i.e.-limited] second phase [i.e.-precipitates]. Dunlop et al teach (see col 4, lines 7-9) that the precipitates of the aluminum alloy are less than about 2 microns, preferably less than one micron. The claim of the present invention reads: "substantial absence of precipitates" which means that a limited amount of precipitates may be present.

Regarding characteristic (d), Dunlop et al teach (see col 8, lines 3-10) that the sputtering target has a grain size of approximately 1  $\mu\text{m}$  for an aluminum sputtering target with 0.5 wt% copper. Approximately 1  $\mu\text{m}$  is read as meaning that the grain size

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is sometimes above 1  $\mu\text{m}$  and sometimes below 1  $\mu\text{m}$ ; therefore, the claim in the present invention of less than about 1  $\mu\text{m}$  is anticipated by Dunlop et al because the grain size can be below 1  $\mu\text{m}$ .

Regarding characteristic (e), Dunlop et al teach (see col 8, lines 11-25) that equal channel angular extrusion is applied to the work-piece in order to produce a particular texture. As seen from figure 11, in example 3B the texture is substantially oriented in the (111) direction. This shows that Dunlop et al teach a sputtering target with a substantially uniform texture and structure.

Regarding the process limitation of "made by a process including casting", the claim is a product-by-process claim and any art that discloses the same product anticipates the claim, even if made by a materially different process.

"Even though product - by process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product - by - process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe , 227 USPQ 964, 966 (Fed. Cir. 1985)

Regarding claims 2, 46, 47, 48, 49, 51, 52 and 54, Dunlop et al teach (see col 4, lines 10-14) that the sputtering target may be manufactured from aluminum, copper, platinum, gold, titanium, tantalum, or molybdenum.

Regarding claim 3, Dunlop et al teach (see col 8, lines 3-10) that the sputtering target can be made from aluminum with 0.5 wt% copper.

Regarding claim 45, the sputtering target of Dunlop et al contains aluminum and copper.

Regarding claim 55, see discussion above about characteristics (b) and (d). Again, the claim is a product-by-process claim and any art that discloses the same product anticipates the claim, even if made by a materially different process.

Regarding claims 56 and 57, Dunlop et al teach (see col 4, lines 10-14) that the sputtering target may be manufactured from aluminum, copper, platinum, gold, titanium, tantalum, or molybdenum.

Regarding claim 58, see discussion above about characteristic (c).

Regarding claim 59, see discussion above about characteristic (e).

Regarding claim 60, see discussion above about characteristic (a).

8. Claims 50 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dunlop et al (US 5,590,389) and Kiiski et al (US 5,623,726) as applied to claim 1 and further in view of Drauglis et al (US 4,374,717).

As cited above, Dunlop et al does not teach or suggest a sputtering target that comprises nickel or silver.

Drauglis et al teach (see col 3, lines 14-26) that sputtering targets which include nickel or silver are known in the art.

Therefore, it would have been obvious to one of ordinary skill in the art to have made the nickel or silver containing sputtering targets of Drauglis et al by the process disclosed by Dunlop et al because the process of Dunlop et al provides a sputtering target with good grain size and texture.

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9. Claims 61-63 and 66-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al (EP 0,882,813) in view of Dunlop et al (US 5,590,389) and Kiiski et al (US 5,623,726).

Takahashi et al teach (see abstract) a sputtering target that comprises copper.

Regarding characteristic (c), Takahashi et al teach that the sputtering target has a high purity. The composition is limited to at least 99.999% by weight of copper.

Therefore, one of ordinary skill in the art would have expected the sputtering target to have a substantial absence of precipitates.

Takahashi et al do not disclose that the target surface has a substantially homogeneous composition at any location, a substantial absence of pores, voids, inclusions and other casting defects, a grain size less than about 1  $\mu\text{m}$ , and a substantially uniform structure and texture at any location.

Dunlop et al teach a method of making a sputtering target. The method involves (see col 4, lines 15-16 and 28-36) atomizing metal powder and then subjecting the powder to multiple passes of equal channel angular extrusion. The method produces excellent sputtering targets, with characteristics such as small grain size.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the method of Dunlop et al to make the sputtering target of Takahashi et al because the method of Dunlop et al produces a sputtering target with very small grain size.

Regarding characteristic (a), the sputtering target of Dunlop et al is made from an identical composition by a process that involves atomization followed by equal channel

angular extrusion. Kiiski et al teach (see col 2, lines 64-67) that atomization of metals produces fully homogenous materials. Therefore, it would have been expected by one of ordinary skill in the art that the method of making a sputtering target of Dunlop et al produces a substantially homogenous composition as claimed.

Regarding characteristic (b), the method of making a sputtering target of Dunlop et al is a process that does not include casting and therefore, would have been expected by one of ordinary skill in the art to have a substantial absence of casting defects as claimed.

Regarding characteristic (d), Dunlop et al teach (see col 8, lines 3-10) that the method of making a sputtering target produces a grain size of approximately  $1\text{ }\mu\text{m}$  for an aluminum sputtering target with 0.5 wt% copper. Approximately  $1\text{ }\mu\text{m}$  is read as meaning that the grain size is sometimes above  $1\text{ }\mu\text{m}$  and sometimes below  $1\text{ }\mu\text{m}$ . Therefore, one of ordinary skill in the art would have expected the method of Dunlop et al to produce a similar reduction of grain size in other sputtering target materials.

Regarding characteristic (e), Dunlop et al teach (see col 8, lines 11-25) that equal channel angular extrusion is applied to the work-piece in order to produce a particular texture. As seen from figure 11, in example 3B the texture is substantially oriented in the (111) direction. This shows that Dunlop et al teach method of making a sputtering target with a substantially uniform texture and structure, and one of ordinary skill in the art would have expected the sputtering target of Takahashi et al to have a substantially uniform texture and structure as claimed.



Regarding the process limitation of "formed by a process including casting", the claim is a product-by-process claim and any art that discloses the same product anticipates the claim, even if made by a materially different process.

Regarding claims 62 and 63, Takahashi et al teach (see abstract) that the alloy contains at most 1 ppm Al. Thus, Takahashi et al teach a sputtering target that comprises Al.

Regarding claim 66, the process limitation of "formed from a cast copper material", the claim is a product-by-process claim and any art that discloses the same product anticipates the claim, even if made by a materially different process. See also paragraphs above regarding characteristics (b) and (d).

Regarding claim 67, Takahashi et al teach that the target is made from high purity copper.

Regarding claims 68 and 69, Takahashi et al teach (see abstract) that the alloy contains up to 1 ppm Al.

Regarding claim 70, see paragraph above regarding characteristic (c).

Regarding claim 71, see paragraph above regarding characteristic (e).

Regarding claim 72, see paragraph above regarding characteristic (a).

10. Claims 61- 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Siewert et al (US 4,466,940) in view of Dunlop et al (US 5,590,389) and Kiiski et al (US 5,623,726).

Siewert et al teach (see abstract) an alloy for targets employed in sputtering that contains (see col 2, lines 5-12) gold, aluminum and the balance copper. Regarding

characteristic (c), Siewert et al does not teach the presence of any precipitates or second phases.

Siewert et al do not teach that the sputtering target surface has a substantially homogeneous composition at any location, a substantial absence of pores, voids, inclusions and other casting defects, a grain size less than about 1  $\mu\text{m}$ , and a substantially uniform structure and texture at any location.

Dunlop et al teach a method of making a sputtering target. The method involves (see col 4, lines 15-16 and 28-36) atomizing metal powder and then subjecting the powder to multiple passes of equal channel angular extrusion. The method produces excellent sputtering targets, with characteristics such as small grain size.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the method of Dunlop et al to make the sputtering target of Siewert et al because the method of Dunlop et al produces a sputtering target with very small grain size.

See discussion of characteristics (a), (b), (d) and (e) above in paragraph no. 7.

Regarding the process limitation of "formed a process including casting", the claim is a product-by-process claim and any art that discloses the same product anticipates the claim, even if made by a materially different process.

Regarding claims 62-64, Siewert et al teach (see col 2, lines 5-12) that the alloy contains aluminum and gold.

11. Claims 61, 62 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nalepka et al (US 4,883,721) in view of Dunlop et al (US 5,590,389) and Kiiski et al (US 5,623,726).

Nalepka et al teach (see abstract) a multiplayer thin film produced by sputtering. Nalepka et al teach (see col 6, lines 11-16) an alloy for targets employed in sputtering the second layer that contains silver and 5-10 wt% copper. Regarding characteristic (c), Nalepka et al does not teach the presence of any precipitates or second phases.

Nalepka et al do not teach that the sputtering target surface has a substantially homogeneous composition at any location, a substantial absence of pores, voids, inclusions and other casting defects, a grain size less than about 1  $\mu\text{m}$ , and a substantially uniform structure and texture at any location.

Dunlop et al teach a method of making a sputtering target. The method involves (see col 4, lines 15-16 and 28-36) atomizing metal powder and then subjecting the powder to multiple passes of equal channel angular extrusion. The method produces excellent sputtering targets, with characteristics such as small grain size.

Therefore, it would have been obvious to one of ordinary skill in the art to have used the method of Dunlop et al to make the sputtering target of Nalepka et al because the method of Dunlop et al produces a sputtering target with very small grain size.

See discussion of characteristics (a), (b), (d) and (e) above in paragraph no. 7.

Regarding the process limitation of "formed a process including casting", the claim is a product-by-process claim and any art that discloses the same product anticipates the claim, even if made by a materially different process.

Regarding claims 62 and 65, Nalepka et al teach (see col 6, lines 11-16) that the alloy contains copper and silver.

***Response to Arguments***

8. Applicant's arguments with respect to claims 1-3 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant's arguments filed 6 June 2001 have been fully considered but they are not persuasive. Applicant has argued that the product of Dunlop et al is not a sputtering target made by a process including casting. Applicant is reminded that the process limitations of a product-by-process claim are not given patentable weight. As long as a reference or references teach or suggest all of the claim limitations of the product, even if made by a completely different method, then the reference(s) either anticipate or obviate the claimed invention.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 6:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for the organization where this application or proceeding is assigned are 703-892-9310 for regular communications and 703-892-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

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Harry D Wilkins, III  
Examiner  
Art Unit 1742

hdw  
December 18, 2002

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